

NORTH AMERICAN

**DIESEL**

March 2008

# PROGRESS

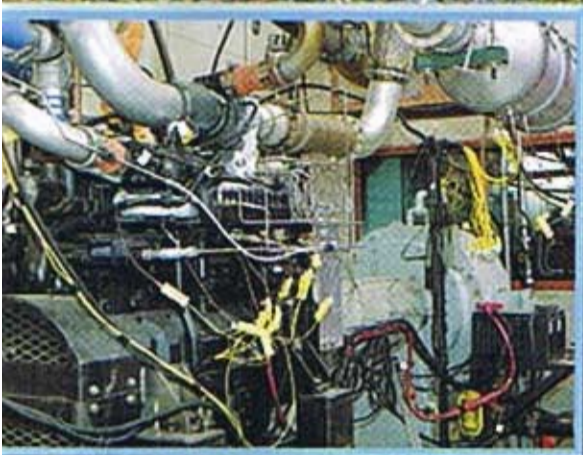
PRODUCTS • TECHNOLOGY • INDUSTRY NEWS

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# Cylinder Honing For Performance

BY MIKE MERCER

**W**hen it comes to manufacturing, rebuilding or servicing hydraulic pumps, valves and engine cylinder bores, honing the surface can make all the difference in performance and service life. One device — the ball-style hone — available from Los Angeles, Calif.-based Brush Research Manufacturing Co. Inc., provides tools for such activities.

After installation in the field, valves and pumps often require maintenance to rid the inside diameter (ID) of bores from foreign material ranging from rust and corrosion to accumulated chemicals and biological matter. Improper cleaning and resurfacing of the ID can mean fewer operating hours between servicing, as well as degraded performance.

One of the most versatile tools used throughout the industry today to perform maintenance on cylindrical IDs is the flexible ball-style hone. Somewhat resembling a spinning bottlebrush, this tool is characterized by abrasive globules permanently mounted to flexible filaments that are attached to a center shaft. This flexible, low-cost tool can be used virtually anywhere for sophisticated surfacing, deburring, edge blending, cleaning and rebuilding of cylinder IDs.

For engines used in all industrial applications including rail, marine and electric power generation operations, it is crucial to service life that the cylinder liner walls be deglazed, refinished and crosshatched when these engines are overhauled. The engines powering large oceangoing vessels such as tankers and freighters are popular applications for this type of tool. Marine service shops that perform maintenance on large ship engines are often scheduled to service them as soon as the vessels come into port.

"These engines can have pistons

as wide as your hat," stated Clarence Mayers, coordinator for Diesel Supply Co., Odessa, Texas. "We sell ball-style hones to users and repair shops who overhaul the big-bore diesels and natural gas engines so they can get a longer service life cycle. Mainly they are used on cylinder liner walls so new rings can seat properly and prevent excessive oil consumption."

The flexible tool produces a controlled surface condition unobtainable by any other method, according to the company. It can deburr, clean out passages or provide IDs with a super-smooth plateau finish free of cut, torn and folded metal. Brush Research Manufacturing (BRM) offers a line of Flex-Hones from 4 mm (0.15 in.) in diameter that are uniquely suited to heavy-duty applications.

Although large-diameter flexible ball-style hones are somewhat unique, they are needed to resurface liners and cylinder bores in larger bore engines used for heavy-duty applications. The tools are available in various grit sizes

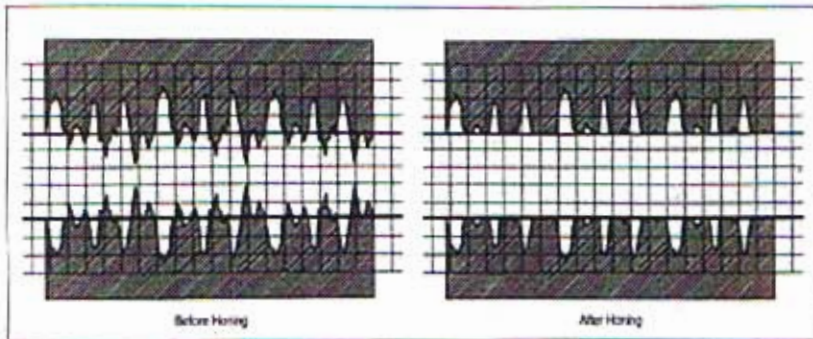
Brush Research Manufacturing offers its line of Flex-Hones in various grit sizes and standard diameters up to 36 in. for its extra heavy-duty products (shown here). The tools are used mainly for resurfacing the cylinder bores of reciprocating diesel and gaseous-fueled engines and hydraulic components from a variety of applications.



and standard diameters up to 36 in. "There is really no limit to the cylinder size this technology can benefit," said Michael Miller, national sales manager for Brush Research Manufacturing Co. Inc. "We encourage our customers to bring us their applications for analysis and a custom-engineered solution when required. We have produced custom tools as large as 137 cm (54 in.)."

Mayers also pointed out that the tool does an especially good job of clearing the ports on two-cycle engine liners. Another type of hone can get hung in the port area and break off honing material, causing havoc when the engine is operated. If the port areas are not relieved, the installed rings can get into the ports and clip the rings' ends — thus breaking off the ends and causing severe damage to the engine. This is called port clipping.

"The unique design of the Flex-Hone allows it to pass over the ports, smoothing down all the rough spots," Mayers explained. "The firing pressure in the



The build-up of glaze and the byproducts of combustion may prevent proper valve operations or block lubricants on the surface of cylinder bores. Proper maintenance tools such as the Flex Hone are designed to leave a smooth plateau finish, as can be seen in this diagram of a surface before and after a honing operation.

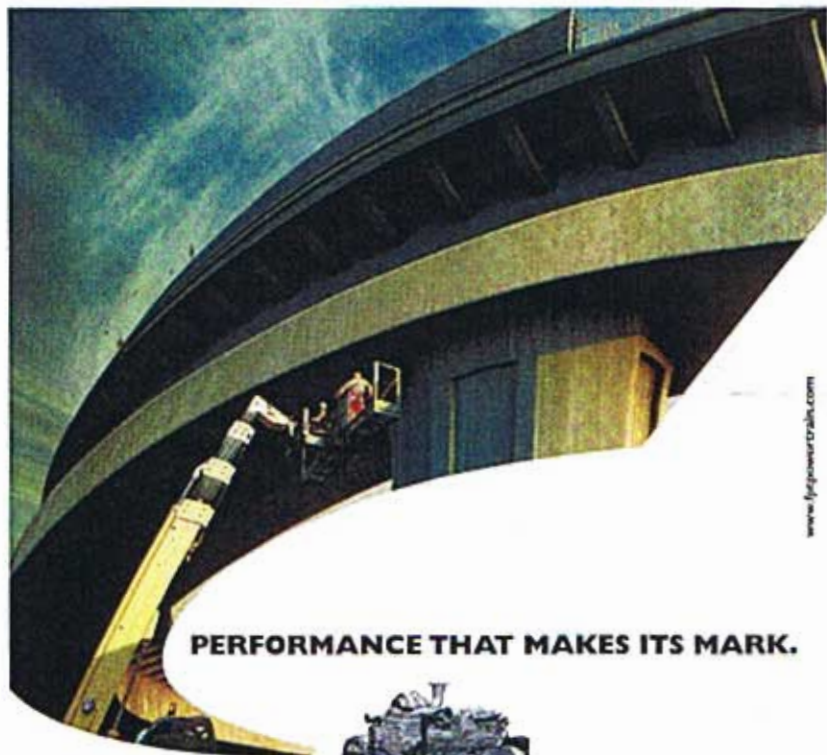
combustion chamber causes the rings to load from the back side, pushing out against the cylinder wall. This style of hone smooths out all of the rough spots around the ports or any other part of the cylinder liner walls top to bottom.

"Getting top-to-bottom cylinder or liner wall coverage is difficult to do with other tools," Mayer says. "The flexible hones that we deal with are probably 12 to 18 in. wide. So, if you run it 2 or 3 in. past the bottom of the liner, that's not a problem. Most of the hone is still inside the cylinder, so it can go down and complete the bottom of the piston travel area. The same applies to the top of the liner, where it gets chamfered because of where the top ring travel ends. The Flex-Hone can blend that area quite easily."

Whether used for cleaning, deburring or plateau finishing, the tool provides a low-temperature abrading process that exposes the undisturbed base metal designed to produce a long-wearing surface free of fragmented, amorphous or smeared metal from previous operations. The abrasive globules each have independent suspension that is self-centering, self-aligning to the bore, and self-compensating for wear. **dp**

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